

APR 16 2003

PTO/SB/08A (04-03)

Approved for use 04-30-2003. OMB 0651-0031

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INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

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Sheet 1 Of 8

COMPLETE IF KNOWN

Application Number	10/026, 020
Filing Date	December 27, 2001
First Named Inventor	Ralph Johnson
Art Unit	2828
Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No ¹	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
TN		US 4445218		04-24-1984	Coldren	
TN		US 4608697		08-26-1986	Coldren	
TN		US 4622672		11-11-1986	Coldren et al.	
TN		US 4829347		05-09-1989	Cheng et al.	
TN		US 4873696		10-10-1989	Coldren et al.	
TN		US 4896325		01-23-1990	Coldren	
TN		US 5045499		09-03-1991	Nishizawa et al.	
TN		US 5082799	A	01-21-1992	Holmstrom et al.	
TN		US 5245622	A	09-14-1993	Jewell et al.	
TN		US 5251225	A	10-05-1993	Eglash et al.	
TN		US 5293392	A	03-08-1994	Shieh et al.	
TN		US 5343487	A	08-30-1994	Scott et al.	
TN		US 5358880	A	10-25-1994	Lebby et al.	
TN		US 5365540	A	11-15-1994	Yamanaka	
TN		US 5392307	A	02-21-1995	Sugiyama et al.	
TN		US 5416044	A	05-16-1995	Chino et al.	
TN		US 5422901	A	06-06-1995	Lebby et al.	
TN		US 5468343	A	11-21-1995	Kitano	
TN		US 5491710	A	02-13-1996	Lo	
TN		US 5513204	A	04-30-1996	Jayaraman	
TN		US 5568504	A	10-22-1996	Kock et al.	
TN		US 5588995	A	12-31-1996	Sheldon	
TN		US 5631472	A	05-20-1997	Cunningham et al.	
TN		US 5693180	A	12-02-1997	Furukawa et al.	
TN		US 5719891	A	02-17-1998	Jewell	
TN		US 5719894	A	02-17-1998	Jewell et al.	

Examiner
Signature

Tuan M Nguyen

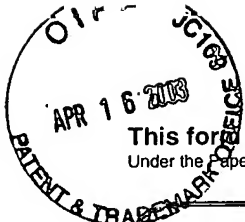
Date
Considered

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INFORMATION DISCLOSURE
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Sheet 2 Of 8

COMPLETE IF KNOWN

Application Number	10/026, 020
Filing Date	December 27, 2001
First Named Inventor	Ralph Johnson
Group Art Unit	2828
Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

TN	US	5719895	A	02-17-1998	Jewell et al.
TN	US	5729567	A	03-17-1998	Nakagawa
TN	US	5732103	A	03-24-1998	Ramdani et al.
TN	US	5747366	A	05-05-1998	Brillouet et al.
TN	US	5754578	A	05-19-1998	Jayaraman
TN	US	5757833	A	05-26-1998	Arakawa et al.
TN	US	5805624	A	09-08-1998	Yang et al.
TN	US	5809051	A	09-15-1998	Oudar
TN	US	5815524	A	09-29-1998	Ramdani et al.
TN	US	5818862	A	10-06-1998	Salet
TN	US	5825796	A	10-20-1998	Jewell et al.
TN	US	5835521	A	11-10-1998	Ramdani et al.
TN	US	5877038	A	03-02-1999	Coldren et al.
TN	US	5883912	A	03-16-1999	Ramdani et al.
TN	US	5898722	A	04-27-1999	Ramdani et al.
TN	US	5903586	A	05-11-1999	Ramdani et al.
TN	US	5912913	A	06-15-1999	Kondow et al.
TN	US	5943357	A	08-24-1999	Lebby et al.
TN	US	5943359	A	08-24-1999	Ramdani et al.
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TN	US	5960018	A	09-28-1999	Jewell et al.
TN	US	5974073	A	10-26-1999	Canard et al.
TN	US	5978398	A	11-02-1999	Ramdani et al.
TN	US	5985683	A	11-16-1999	Jewell
TN	US	5991326	A	11-23-1999	Yuen et al.
TN	US	6021147	A	02-01-2000	Jiang et al.
TN	US	6046065	A	04-04-2000	Goldstein et al.
TN	US	6049556	A	04-11-2000	Sato
TN	US	6052398	A	04-18-2000	Brillouet et al.
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TN	US	6061380	A	05-09-2000	Jiang et al.
TN	US	6061381	A	05-09-2000	Adams et al.

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Tuan M Nguyen

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Filing Date	December 27, 2001
First Named Inventor	Ralph Johnson
Group Art Unit	2828
Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

TN	US	6121068	A	09-19-2000	Ramdani et al.	
TN	US	6127200	A	10-03-2000	Ohiso et al.	
TN	US	6148016	A	11-14-2000	Hegblom et al.	
TN	US	6195485	B1	02-27-2001	Coldren et al.	
TN	US	6207973	B1	03-27-2001	Sato et al.	
TN	US	6252896	B1	06-26-2001	Tan et al.	
TN	US	6314118	B1	11-06-2001	Jayaraman et al.	
TN	US	6341137	B1	01-22-2002	Jayaraman et al.	
TN	US	6359920	B1	03-19-2002	Jewell et al.	
TN	US	6362069	B1	03-26-2002	Forrest et al.	
TN	US	6366597	B1	04-02-2002	Yuen et al.	
TN	US	6372533	B2	04-16-2002	Jayaraman et al.	
TN	US	6424669	B1	07-23-2002	Jiang et al.	
TN	US	6434180	B1	08-13-2002	Cunningham	
TN	US	6542530	B1	04-01-2003	Shieh et al.	
TN	US	2002/ 0067748	A1	06-06-2002	Coldren et al.	
TN	US	2002/ 0071464	A1	06-13-2002	Coldren et al.	
TN	US	2002/ 0075920	A1	06-20-2002	Spruytte et al.	
TN	US	2002/ 0071471	A1	06-13-2002	Kim et al.	
TN	US	2002/ 0075929	A1	06-20-2002	Cunningham	
TN	US	2002/ 0090016	A1	07-11-2002	Coldren et al.	
TN	US	2002/ 0131462	A1	09-19-2002	Line et al.	
TN	US	2003/ 0053510	A1	03-20-2003	Yuen et al.	

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Filing Date	December 27, 2001
First Named Inventor	Ralph Johnson
Group Art Unit	2828
Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No ¹	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³	Number ⁴	Kind Code ⁵ (if known)				
TN		EP	0 740 377	A1	10-30-1996	Hewlett-Packard Company		
TN		EP	0 740 377	B	10-30-1996	Hewlett-Packard Company		
TN		EP	0 765 014	A1	03-26-1997	France Telecom		
TN		EP	0 765 014	B1	07-28-1999	France Telecom		
TN		EP	0 822 630	A1	02-04-1998	Hewlett-Packard Company		
TN		EP	0 874 428	A2	10-28-1998	Motorola, Inc.		
TN		EP	0 874 428	A3	11-04-1998	Motorola, Inc.		
TN		EP	0 874 428	B1	15-04-1998	Motorola, Inc.		
TN		EP	1 294 063	A1	03-19-2003	Avalong Photonics AG		
TN		JP	57026492	A	02-12-1982	NEC Corp.		
TN		WO	98/007218	A1	02-19-1998	W.L. Gore & Associates, Inc.		
TN		WO	00/033433	A2	06-08-2000	Arizona Board of Regents		
TN		WO	00/033433	A3	06-08-2000	Arizona Board of Regents		
TN		WO	00/038287	A1	06-29-2000	Honeywell, Inc.		
TN		WO	00/052789	A2	02-29-2000	The Regents of the University of California		
TN		WO	00/052789	A3	02-29-2000	The Regents of the University of California		
TN		WO	00/065700	A2	11-02-2000	Gore Enterprise Holdings, Inc.		
TN		WO	00/065700	A3	11-02-2000	Gore Enterprise Holdings, Inc.		
TN		WO	01/016642	A2	03-08-2001	Agility Communications		
TN		WO	01/016642	A3	03-08-2001	Agility Communications		
TN		WO	01/017076	A2	03-08-2001	The Regents of the University of California		
TN		WO	01/017076	A3	03-08-2001	The Regents of the University of California		

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First Named Inventor	Ralph Johnson
Group Art Unit	2828
Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

TN	WO	01/018919	A1	03-15-2001	The Regents of the University of California
TN	WO	01/024328	A2	04-05-2001	Agility Communications
TN	WO	01/024328	A3	04-05-2001	Agility Communications
TN	WO	01/033677	A2	05-10-2001	Arizona Board of Regents
TN	WO	01/033677	A3	05-10-2001	Arizona Board of Regents
TN	WO	01/084682	A2	11-08-2001	Agility Communications, Inc.
TN	WO	01/093387	A2	12-06-2001	Sandia Corporation
TN	WO	01/093387	A3	12-06-2001	Sandia Corporation
TN	WO	01/095444	A2	12-13-2001	Agility Communications, Inc.
TN	WO	01/098756	A2	12-27-2001	The Regents of the University of California
TN	WO	02/003515	A2	01-10-2002	Agility Communications, Inc.
TN	WO	02/017445	A1	02-28-2002	The Regents of the University of California
TN	WO	02/084829	A1	10-24-2002	Cielo Communications, Inc.

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ²
TN		ALMUNEAU, G., et al., "Accurate control of Sb composition in AlGaAsSb alloys on InP substrates by molecular beam epitaxy", article, Journal of Crystal Growth, Vol 208, 05-06-1999, pgs 113-6.	
TN		ALMUNEAU, G., et al., "Improved electrical and thermal properties of InP-AlGaAsSb Bragg mirrors for long-wavelength vertical-cavity lasers", article, IEEE Photonics Technology Letters, Vol. 12, No 10, Oct 2000, pgs 1322-4.	
TN		ALMUNEAU, G., et al., "Molecular beam epitaxial growth of monolithic 1.55 μ m vertical cavity surface emitting lasers with AlGaAsSb/AlAsSb Bragg mirrors", article, Journal of Vacuum Science Technology, Vol 8, No 3, May/Jun 2000, pgs 1601-4.	
TN		BLACK, K., et al. "Double-fused 1.5 μ m vertical cavity lasers with record high T_o of 132K at room temperature", article, Electronics Letters, Vol 34, No 20, 10-01-1998, pgs 1947-9.	
TN		BLUM, O., et al., "Electrical and optical characteristics of AlAsSb/BaAsSb distributed Bragg reflectors for surface emitting lasers", article, Applied Physics Letters, Vol 67, No 22, 11-27-1995, pgs 3233-5.	
TN		BLUM, O., et al., "Highly reflective, long wavelength AlAsSb/GaAsSb distributed Bragg reflector grown by molecular beam epitaxy on InP substrates", article, Applied Physics Letters, Vol. 66, No 3, 01-16-1995, pgs 329-31.	
TN		BOUCART, J., et al., "1mW CW-RT monolithic VCSEL at 1.55 μ m", article, IEEE Photonic Technology Letters, Vol 11, No 6, Jun 1999, pgs 629-31	

Examiner
Signature

Tuan M Nguyen

Date
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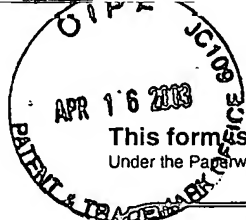
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First Named Inventor	Ralph Johnson
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Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

TN	CAMPBELL, J., et al., "Quantum dot resonant cavity photodiode with operation near 1.3 μm wavelength", article, Electronics Letters, Vol 33, No 15, 07-17-1997, pgs 1337-9.
TN	CHANG, C., et al., "Parasitics and design considerations on oxide-implant VCSELs", article, IEEE Photonics Technology Letters, Vol 13, No 12, Dec 2001, pgs 1274-6.
TN	CHOQUETTE, K., et al., "Room temperature continuous wave InGaAsN quantum well vertical-cavity lasers emitting at 1.3 μm ", article, Electronics Letters, Vol 36, No. 16, 08-03-2000, pgs 1388-90.
TN	DOWD, P., et al., "Long wavelength (1.3 and 1.5 μm) photoluminescence from InGaAs/GaPAsSb quantum wells grown on GaAs", article, Applied Physics Letters, Vol 75, No 9, 08-30-1999, pgs 1267-9.
TN	DUDLEY, J., et al., "Water fused long wavelength vertical cavity lasers", conference proceedings, LEOS '93 Conference Proceedings. IEEE Lasers and Electro-Optics Society 1993 Annual Meeting, Nov 15/8, 1993, pgs 560-1.
TN	GOURLEY, F., et al., "Epitaxial semiconductor optical interference devices", invited paper, SPIE, Vol 792, 1987, pgs 178-189.
TN	GUDEN, M., et al., "Material parameters of quaternary III-V semiconductors for multiplayer mirrors at 1.55 μm wavelength", article, Modeling Simulation Material Science Engineering, Vol 4 1966, pgs 349-57.
TN	GUO, C., et al., "Theoretical investigation of strained InGaAs/GaPAsSb type-II quantum wells on GaAs for long wavelength (1.3 μm) optoelectronic devices", post-conference paper, Dept of Electrical Engineering & Center for Solid State Electronics Research, ASU, Tempe, AZ, Apr 1999, pgs 30-1.
TN	GUY, D., et al., "Theory of an electro-optic modulator based on quantum wells in a semiconductor étalon", conference paper, Quantum Well and Superlattice Physics, Mar 23/4, 1987, pgs 189-96.
TN	HALL, E., et al., "Electrically-pumped, single-epitaxial VCSELs at 1.55 μm with Sb-based mirrors", article, Electronics Letters, Vol 35, No 16, 08-05-1999, pgs 1-2.
TN	HALL, E., et al., "Increased lateral oxidation rates of AlInAs on InP using short-period superlattices", article, Applied Physics Letters, Vol 29, No 9, 01-08-2002, pgs 1100-4.
TN	HALL, E., et al., "Selectively etched undercut apertures in AlAsSb-based VCSELs", article, IEEE Photonics Technology Letters, Vol 13, No 2, Feb 2001, pgs 97-9.
TN	HEGBLOM, E., et al., "Small efficient vertical cavity lasers with tapered oxide apertures", article, Electronics Letters, Vol 34, No 9, 04-30-1998, pgs 895-6.
TN	HEROUX, J., et al., "Optical investigation of InGaAsN/GaAs strained multi-quantum wells", 20 th North American Conference on Molecular Beam Epitaxy, Oct 1-3, 2001, pg 2.
TN	HONG, Y., et al., "Improving Ga(In)Nas properties by migration-enhanced epitaxy and superlattices", 43 rd 2001 Electronic Material Conference, Session G, Paper G10, 06-27-2001.
TN	HONG, Y., et al., "Growth of GaInNAs quaternaries using a digital alloy technique", conference paper, Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures, Oct 01/3, 2001, pgs 1163-6.
TN	HUFFAKER, D., et al., "1.15 μm wavelength oxide-confined quantum-dot vertical-cavity surface-emitting laser", article, IEEE Photonics Technology Letters, Vol 10, No 2, Feb 1998, pgs 185-7.
TN	HUFFAKER, D., et al., "1.3 μm room-temperature GaAs-based quantum-dot laser", Applied Physics Letters, Vol 73, No 18, 11-02-1998, pgs 2564-6.
TN	IGA, K., "Semiconductor laser in the 21 st century", California conference papers, Photodetectors: Materials and Devices VI, Jan 22/4, 2001, pgs xi-xxv.
TN	JAYARAMAN, V., et al., "Uniform threshold current, continuous-wave, singlemode 1300 nm vertical cavity lasers from 0 to 70°C", article, Electronics Letters, Vol 34, No 14, 07-09-1998, pgs 1405-7.

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Signature*Tuan M Nguyen*Date
Considered

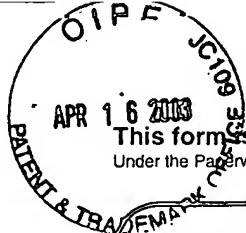
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STATEMENT BY APPLICANT

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Sheet 7 Of 8

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Application Number	10/026, 020
Filing Date	December 27, 2001
First Named Inventor	Ralph Johnson
Group Art Unit	2828
Examiner Name	Tuan M Nguyen
Attorney Docket Number	V637-02670 US

TN	KIM, J., et al., "Epitaxially-stacked multiple-active-region 1.55 μm lasers for increased differential efficiency", article, Applied Physics Letters, Vol 74, No 22, 05-31-1999, pgs 3251-3.
TN	KIM, J., et al., "Room-temperature, electrically-pumped multiple-active-region VCSELs with high differential efficiency at 1.55 μm ", article, Electronics Letters, Vol 35, No 13, 06-24-1999, pgs 1-2.
TN	KOTAKI, Y., et al., "GaInAsP/InP surface emitting layer with two active layers", article, Extended Abstracts of the 16 th (1984 International) conference on Solid State Devices and Materials, pgs 133-6.
TN	KOYAMA, F., et al., "Room temperature CWS operation of GaAs vertical cavity surface emitting laser", article, The Transactions of the IEICE, Vol E71, No 11, Nov 1988, pgs 1089-90.
TN	LARSON, J., et al., "GaInNAs-GaAs long-wavelength vertical-cavity surface-emitting laser diodes", article, IEEE Photonics Technology Letters, Vol 10, No 2, Feb 1998, pgs 188-90.
TN	LEE, Y., et al., "Physics and nonlinear device applications of bulk and multiple quantum well GaAs", invited paper, SPIE Vol 792 Quantum Well and Superlattice Physics (1987), pgs 128-133.
TN	LI, J., et al., "Persistent photoconductivity in $\text{Ga}_{1-x}\text{In}_x\text{N}_y\text{As}_{1-y}$ ", article, Applied Physics Letters, Vol 75, No 13, 09-27-1999, pgs 1899-1901.
TN	MIRIN, R., et al., "1.3 μm photoluminescence from InGaAs quantum dots on GaAs", article, Applied Physics Letter 67 (25), 12-18-1995, pgs 3795-7.
TN	NAKAGAWA, S., et al., "1.55 μm InP-lattice-matched VCSELs with AlGaAsSb-AlAsSb DBRs", article, IEEE Journal on Selected Topics in Quantum Electronics, Vol 7, No 2, Mar/Apr 2001, pgs 224-30.
TN	NAKAHARA, K., et al., "1.3 μm continuous-wave lasing operation in GaInNAs quantum-well lasers", article, IEEE Photonics Technology Letters, Vol 10, No 4, Apr 1998, pgs 487-8.
TN	NAONE, R., et al., "Tapered air apertures for thermally robust VCL structures", article, IEEE Photonics Technology Letters, Vol 11, No 11, Nov 1999, pgs 1339-41.
TN	NELSON, D., et al., "Band nonparabolicity effects in semiconductor quantum wells", article, Rapid Communications, Vol 35, No 17, 02-15-1987, pgs 7770-7773.
TN	OHNOKI, N., et al., "Superlattice AlAs/AlInAs-oxide current aperture for long wavelength InP-based vertical-cavity surface-emitting laser structure", article, Applied Physics Letters, Vol 73, No 22, 11-30-1998, pgs 3262-4.
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TN	PETERS, M., et al., "Realization and modeling of a pseudomorphic $(\text{GaAs}_{1-x}\text{Sb}_x\text{In}_y\text{Ga}_{1-y}\text{As})/\text{GaAs}$ bilayer-quantum well", article, Applied Physics Letter 67 (18), 10-30-1995, pgs 263941.
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TN	PIPREK, J., et al., "Minimum temperature sensitivity of 1.55 μm vertical-cavity lasers at -30 nm gain offset", article, Applied Physics Letters, Vol 72, No 15, 04-13-1998, pgs 1814-6.
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TN	SCOTT, J., et al., "High efficiency submilliamp vertical cavity lasers with intracavity contacts", article, IEEE Photonics Technology Letters, Vol 6, No 6, Jun 1994, pgs 678-80.

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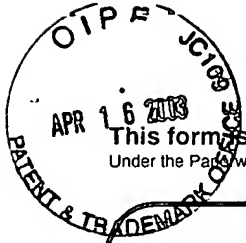
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TN	STARCK, C., "Long wavelength VCSEL with tunnel junction and metamorphic AlAs/GaAs conductive DBR", article, Physics Review B, Vol 39, No 3, 01-15-1989, pgs 1871-83.
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TN	YAMADA, M., et al., "Low-threshold lasing at 1.3 μm from GaAsSb quantum wells directly grown on GaAs substrates", article, IEEE, 0-7803-4947, 04/1998, pgs 149-50.
TN	YAMADA, M., et al., "Room temperature low-threshold CW operation of 1.23 μm GaAsSb VCSELs on GaAs substrates", article, Electronics Letters, 03-30-2000, Vol 36, No 7, pgs 637-638.
TN	YANG, X., et al., "High performance 1.3 μm InGaAsN:Sb/GaAs quantum well lasers grown by molecular beam epitaxy", journal article, Journal of Vacuum Science and Technology B Microelectronics and Nanometer Structures, Vol. 18, No 3, Oct 1999, pgs 1484-7.
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TN	YANO, M., et al., "Time-resolved reflection high energy electron diffraction analysis for atomic layer depositions of GaSb by molecular beam epitaxy", article, Journal of Crystal Growth, Vol 146, 1995, pgs 349-53.
TN	YUEN, W., et al., "High-performance 1.6 μm single-epitaxy top-emitting VCSEL", article, Electronics Letters, Vol 36, No 13, 06-22-2000, pgs 1121-3.

Examiner Signature	<i>Tuan M Nguyen</i>	Date Considered	5-20-03
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